2. Equations

Questions Pg-34

1. Question

“Six more marks and I would’ve got full hundred marks in the math test”, Rajan was sad. How much mark did he actually get?

Answer

6 marks more would make 100 marks in Math test, which means 6 less than 100, that is, 100 – 6 = 94.

2. Question

Mother gave 60 rupees to Lissy for buying books. She gave back the 13 rupees left. For how much money did she buy books?

Answer

13 rupees more will make the total to 60 rupees, which means 13 less than 60, that is, 60 – 13 = 47.

3. Question

Gopalan bought a bunch of bananas. 7 of them were rotten which he threw away. Now there are 46. How many bananas were there in the bunch?

Answer

If we add 7 more bananas to the 46 bananas, we will get the total number of bananas Gopalan bought, which means 7 more than 46, that is, 46 + 7 = 53.

4. Question

Vimala spent 163 rupees shopping and now she has 217 rupees. How much money did she have at first?

Answer

If we add remaining 217 rupees to 163 rupees which were spent, we will get total money she had at first, which means 163 more than 217, that is, 163 + 217 = 380.

5. Question

264 added to a number makes it 452. What is the number?

Answer

264 more will make the total to 452, which means 264 less than 452, that is, 452 – 264 = 188.

6. Question

198 subtracted from a number makes it 163. What is the number?

Answer

If we subtract 198 from the number we will get 163, which means 163 more than 198, that is, 198 + 163 = 361.

Questions Pg-35

1. Question

In a company, the manager’s salary is five times that of a peon. The manager gets 40000 rupees a month. How much does a peon gets a month?

Answer

40000 rupees is 5 times the peon’s salary. Hence peon’s salary is $\frac{1}{5}$th of the manager’s salary, that is,

$$40000 \times \frac{1}{5} = 8000$$

2. Question

The travelers of a picnic split equally, the 5200 rupees spent. Each gave 1300 rupees. How many travelers were there?

Answer

1300 rupees is given by each, which means number of travelers are 1300 of 5200, that is,

$$5200 \times \frac{1}{1300} = 4$$

3. Question

A number multiplied by 12 gives 756. What is the number?

Answer

756 is 12 times of the number, which means number is 12 of 756, that is,

$$756 \times \frac{1}{12} = 63.$$

4. Question

A number divided by 21 gives 756. What is the number?

Answer

756 is $\frac{1}{21}$ of the number, which means number is 21 times of 756, that is,

756 × 21 = 15876.

Questions Pg-37

1. Question

Anita and her friends bought pens. For five pens bought together, they got a discount of three rupees and it cost them 32 rupees. Had they bought the pens separately, how much would each have to spend?

Answer

Five pens cost 32 rupees after a discount of 3 rupees.

∴ their cost without discount = 32 + 3 = 35 rupees.

∴ cost of five pens (without discount) = 35 rupees

Hence, cost of each pen = 35/5 = 7rupees

2. Question

The perimeter of a rectangle is 25 metres and one of its side is 5 metres. How many metres is the other side.

Answer

Given:

Perimeter = 25 metres

Let the two sides of the rectangle be ‘l’ & ‘b’, where l is the length & b is the breadth.

Then, l = 5 m (given)

b = ? (to find)

Now,

Perimeter of rectangle = 2 × (length + breadth)

⇒ 25 = 2 × (l + b)

⇒ 25 = 2 × (5 + b)

Simplifying the bracket, we get,

⇒ 25 = 2 × 5 + 2b

⇒ 25 = 10 + 2b

⇒ 25 –10 = 2b

⇒ 15 = 2b

Or

$$b = \frac{15}{2} = 7.5\,m$$

Perimeter of rectangle = 2 × (length + breadth)

= 25 metres (given)

∴ Perimeter is obtained by multiplying the sum of length and breadth by 2

∴ sum of length can be obtained by dividing the perimeter by 2

∴ sum of length and breadth of the given rectangle = perimeter/2

⇒ 25/2

= 12.5metres

∴ sum of 2 sides is 12.5 metres

Since one side is 5 metres

∴ Other side = 12.5-5 = 7.5 metres

3 A. Question

In each of the problems below, the result of doing some operations on a number is given. Find the number.

three added to double is 101.

Answer

After adding 3 to the double, the number becomes 101,

Therefore, the double of the number is 101-3 = 98

∴ the required number is = $\frac{98}{2}$ = 49

3 B. Question

two added to triple is 101.

Answer

After adding 3 to the triple, the number becomes 101,

Therefore, the triple of the number is 101-2 = 99

∴ the required number is = $\frac{99}{3}$ = 33

3 C. Question

three subtracted from double is 101.

Answer

After subtracting 3 from the double, the number becomes 101,

Therefore, the double of the number is 101 + 3 = 104

∴ the required number is = $\frac{104}{2}$ = 52

3 D. Question

two subtracted from triple is 101.

Answer

After subtracting 2 from the triple, the number becomes 101,

Therefore, the triple of the number is 101 + 2 = 103

∴ the required number is $\frac{103}{3}$ = 34.33

4. Question

Half a number added to the number gives 111. What is the number?

Answer

$\frac{1}{2} + 1 = \frac{3}{2}$

∴ Half a number added to the number will give a number which will be $\frac{3}{2}$ times the original number.

∴ $\frac{3}{2}$ times the original number = 111

Hence, the original number = $\frac{111}{\frac{3}{2}}$

$\Rightarrow 111 \times \frac{2}{3}$

⇒ 37 × 2

⇒74

5. Question

A piece of folk math: a child asked a flock of birds, “How many are you?”

A bird replied.

We and us again,

With half of us

And half to that

With one more,

Would make hundred”

How many birds were there?

Answer

Let the number of birds be ‘b’

We and us again = b + b = 2b

With half of us = $2b + \frac{b}{2}$

And half of that = $2b + \frac{b}{2} + \frac{b}{4}$

With one more = $2b + \frac{b}{2} + \frac{b}{4} + 1$

Would make hundred =

$$2b + \frac{b}{2} + \frac{b}{4} + 1 = 100$$

$$\Rightarrow 2b + \frac{3b}{4} + 1 = 100$$

$$\Rightarrow \frac{11b}{4} + 1 = 100$$

$$\Rightarrow \frac{11b}{4} = 100 - 1$$

$$\Rightarrow \frac{11b}{4} = 99$$

$\Rightarrow 11b = 99 \times 4$

$$\Rightarrow b = \frac{99 \times 4}{11}$$

$\Rightarrow b = 36$

Hence, number of birds = 36.

Questions Pg-41

1. Question

The perimeter of a rectangle is 80 metres and its length is one metre more than twice the breadth. What are its length and breadth?

Answer

Let the breadth of the rectangle be x metres.

Twice the breadth = 2x metres

One more than twice the breadth = 2x + 1 metres

∴ Length of the given rectangle = 2x + 1 metres

Perimeter of the rectangle = 80 metres (given)

⇒ 2(length + breadth) = 80

⇒ 2(2x + 1 + x) = 80

⇒ 2(3x + 1) = 80 (Transporting 2 to RHS)

$$\Rightarrow 3x + 1 = \frac{80}{2}$$

⇒ 3x + 1 = 40

⇒ 3x = 40-1

⇒ 3x = 39

$$\Rightarrow x = \frac{39}{3}$$

⇒x = 13

Hence,

Length of the rectangle = 2x + 1 = 2 × 13 + 1 = 27 metres

Breadth of the rectangle = x = 13 metres

2. Question

From a point on a line, another line is to be drawn such that the angle on one side is 50° more than the angle on the other side. How much is the smaller angle?

Answer

Let smaller angle be x°

Angle on the other side is 50° more than the smaller angle.

∴ Angle on the other side = (x + 50)°

Since, both the angles together form a line,

Their sum = 180°

⇒ x + 50 + x = 180

⇒ 2x + 50 = 180

⇒ 2x = 180-50

⇒ 2x = 130

$\Rightarrow x = \frac{130}{2}$

⇒ x = 65

Hence,the smaller angle = x° = 65°

3. Question

The price of a book is 4 rupees more than the price of a pen. The price of a pencil is 2 rupees less than the price of the pen. The total price of 5 books, 2 pens and 3 pencils is 74 rupees. What is the price of each?

Answer

Let price of a pen be x rupees

Then, price of 2 pens = 2x rupees

Since, Price of book is 4 rupees more than price of a pen,

∴ Price of a book = x + 4rupees

∴ price of 5 books = 5(x + 4) = 5x + 5 × 4 rupees = 5x + 20 rupees

Price of a pencil is two rupees less than that of pen

∴ price of a pencil = x-2 rupees

∴ price of 3 pencils = 3(x-2) = 3x-3 × 2 rupees = 3x-6 rupees

Total price of 5 books, 2 pens and 3 pencils = 74 rupees

⇒ 5x + 20 + 2x + 3x-6 = 74

⇒ 10x + 14 = 74

⇒ 10x = 74-14

⇒ 10x = 60

$\Rightarrow x = \frac{60}{10}$

⇒ x = 6

Hence ,

Price of a pen = x = 6 rupees

Price of a book = x + 4 = 10 rupees

Price of a pencil = x-2 = 4 rupees

4 A. Question

The sum of three consecutive natural numbers is 36. What are the numbers?

Answer

Let the three consecutive natural numbers be x,x + 1,x + 2.

Their sum = 36

⇒ x + x + 1 + x + 2 = 36

⇒ 3x + 3 = 36

⇒ 3x = 36-3

⇒ 3x = 33

$\Rightarrow x = \frac{33}{3}$

⇒ x = 11

Hence, the required three consecutive numbers are 11 ,11 + 1,11 + 2 = 11,12 and 13.

4 B. Question

The sum of three consecutive even numbers is 36. What are the numbers?

Answer

Let the first even number be 2x.(We are taking 2x to make sure that the number is even i.e. divisible by 2)

Then, the next even numbers = 2x + 2 and 2x + 2 + 2 = 2x + 4

Their sum = 36

⇒ 2x + 2x + 2 + 2x + 4 = 36

⇒ 6x + 6 = 36

⇒ 6x = 36-6

⇒ 6x = 30

$\Rightarrow x = \frac{30}{6}$

⇒x = 5

⇒ 2x = 10

2x + 2 = 2 × 5 + 2 = 12

2x + 4 = 2 × 5 + 4 = 14

Hence,the required three consecutive even numbers are 10,12,and 14.

4 C. Question

Can the sum of three consecutive odd numbers be 36? Why?

Answer

If possible, let the three consecutive odd numbers be 2x + 1,2x + 3,2x + 5(we take 2x + 1 to make sure that it is not divisible by 2,i.e. it is a odd number(here x is a natural number))

Their sum = 36

⇒ 2x + 1 + 2x + 3 + 2x + 5 = 36

⇒ 6x + 9 = 36

⇒ 6x = 27

$\Rightarrow x = \frac{27}{6}$

⇒ x = 4.5

2x + 1 = 2 × 4.5 + 1 = 10

According to our assumption x must be a natural number, but here it is not.

As a result of which 2x + 1 is also not an odd number.

Hence, sum of three consecutive odd numbers cannot be 36.

4 D. Question

The sum of three consecutive odd numbers is 33. What are the numbers?

Answer

Let the three consecutive odd numbers be 2x + 1,2x + 3,2x + 5(we take 2x + 1 to make sure that it is not divisible by 2,i.e. it is a odd number(here x is a natural number))

Their sum = 33

⇒ 2x + 1 + 2x + 3 + 2x + 5 = 33

⇒ 6x + 9 = 33

⇒ 6x = 33-9

⇒ 6x = 24

$\Rightarrow x = \frac{24}{6}$

⇒ x = 4

⇒ 2x + 1 = 2 × 4 + 1 = 9

2x + 3 = 2 × 4 + 3 = 11

2x + 5 = 2 × 4 + 5 = 13

Hence, the required three consecutive odd numbers are 9,11 and 13.

4 E. Question

The sum of three consecutive natural numbers is 33. What are the numbers?

Answer

Let the three consecutive natural numbers be x,x + 1,x + 2.

Their sum = 33

⇒ x + x + 1 + x + 2 = 33

⇒ 3x + 3 = 33

⇒ 3x = 33-3

⇒ 3x = 30

$\Rightarrow x = \frac{30}{3}$

⇒ x = 10

⇒ x + 1 = 11

x + 2 = 12

Hence, the three required consecutive natural numbers are 10,11 and 12.

5 A. Question

In a calendar, a square of four numbers is marked. The sum of the numbers is 80. What are the numbers?

Answer

Since, the square is composed of 4 numbers,

2 numbers will mark its length, and 2 numbers will mark its breadth.

(as both are equal in square)

Two numbers will be consecutive and the other two numbers will be the same days of the next week (∴ they will also be consecutive)

Let the smallest number be x.

∴ next number = x + 1

Next week, same day

Number will be x + 7

And next number to it = x + 7 + 1 = x + 8

Sum of all the four numbers = 80(given)

⇒ x + x + 1 + x + 7 + x + 8 = 80

⇒ 4x + 16 = 80

⇒ 4x = 80-16

⇒ 4x = 64

$\Rightarrow x = \frac{64}{4}$

⇒x = 16

x + 1 = 17

x + 7 = 23

x + 8 = 24

Hence, the required numbers are 16,17,23 and 24.

5 B. Question

A square of nine numbers is marked in a calendar. The sum of all these numbers is 90. What are the numbers?

Answer

Since, the square is composed of 9 numbers,

3 numbers will mark its length, and 3 numbers will mark its breadth.

(as both are equal in square)

three numbers will be consecutive and the next three numbers will be the same days of the next week (∴ they will also be consecutive)

and the next three numbers will be the same days of the next week (∴ they will also be consecutive)

Let the smallest number be x.

∴ next number = x + 1

∴next number = x + 3

Next week, same day

Number will be x + 7

And next number to it = x + 7 + 1 = x + 8

Next number = x + 8 + 1 = x + 9

Next week, same day

Number will be x + 7 + 7 = x + 14

Next number = x + 14 + 1 = x + 15

Next number = x + 15 + 1 = x + 16

Sum of all the nine numbers = 90(given)

⇒ x + x + 1 + x + 2 + x + 7 + x + 8 + x + 9 + x + 14 + x + 15 + x + 16 = 90

⇒ 9x + 72 = 90

⇒ 9x = 90-72

⇒ 9x = 18

$\Rightarrow x = \frac{18}{9}$

⇒x = 2

x + 1 = 3

x + 2 = 4

x + 7 = 9

x + 8 = 10

x + 9 = 11

x + 14 = 17

x + 15 = 18

x + 16 = 19

Hence, the required numbers are 2,3,4,9,10,11,17,18and 19.

Questions Pg-44

1. Question

Ticket rate for the science exhibition is 10 rupees for a child and 26 rupees for an adult. 740 rupees was got from 50 persons. How many children among them?

Answer

Let number of adults be x

Since, total number of persons is 50

Number of children = 50-x

Ticket rate for a child is 10 rupees

∴ ticket rate of 50-x children = 10(50-x) = 500-10x rupees

Ticket rate of an adult is 26 rupees

∴ ticket rate of x adults = 26x rupees

Total amount collected = 740 rupees

⇒ 26x + 500-10x = 740

⇒ 16x + 500 = 740

⇒ 16x = 740-500

⇒ 16x = 240

$\Rightarrow x = \frac{240}{16}$

⇒x = 15

Hence, Number of children = 50-x = 50-15 = 35

2. Question

A class has the same number of girls and boys. Only eight boys were absent on a particular day and then the number of girls was double the number of boys. What is the number of boys and girls?

Answer

Let the number of girls and boys in the class be x each.

On a particular day

8 boys were absent

∴ number of boys present = x-8

Since, number of girls is twice the number of boys present on that day

x = 2(x-8)

Solving the brackets, we get

X = 2x-2 × 8

⇒ x = 2x-16

⇒ 16 = 2x-x

⇒16 = x

Hence, number of boys and girls in the class = 16 each

3. Question

Ajayan is ten years older than Vijayan. Next year, Ajayan’s age would be double that of Vijayan. What are their age’s now?

Answer

Let Vijayan’s present age be x years.

Since, Ajayan is 10 years older than Vijayan

Ajayan’s present age = x + 10 years

Next year,

Vijayan’s age will be = x + 1 years

And Ajayan’s age will be = x + 10 + 1 = x + 11 years

Since it is given that Next year, Ajayan’s age would be double that of Vijayan

⇒ x + 11 = 2(x + 1)

Solving the brackets,we get

x + 11 = 2x + 2 × 1

⇒ x + 11 = 2x + 2

⇒11-2 = 2x-x

⇒9 = x

Hence, Present age of

Ajayan = x + 10 = 9 + 10 = 19 years.

Vijayan = x = 9 years.

4. Question

Five times a number is equal to three times the sum of the number and 4. What is the number?

Answer

Let the required number be x.

∴ Five times the number = 5x

Sum of the number and 4 = x + 4

∴ 3 times the sum of the number and four = 3(x + 4) = 3x + 3 × 4 = 3x + 12

Since, five times the number is equal to three times the sum of the number and 4

∴ 5x = 3x + 12

⇒ 5x-3x = 12

⇒ 2x = 12

$\Rightarrow x = \frac{12}{2}$

⇒x = 6

Hence, the required number = 6

5. Question

In a co-operative society, the number of men is thrice the number of women. 29 women and 16 men more joined the society and now the number of men is double the number of women. How many women were there in the society at first?

Answer

Lethe original number of women in the society be x.

Since number of men is thrice the number of women,

Number of men = 3x

Number of women after joining of 29 more women = x + 29

Number of men after joining of 16 more men = 3x + 16

Since, the new number of men is twice the number of women

∴ 3x + 16 = 2(x + 29)

Solving the brackets, we get

3x + 16 = 2x + 2 × 29

⇒ 3x + 16 = 2x + 58

⇒ 3x = 2x + 58-16

⇒ 3x = 2x + 42

⇒ 3x-2x = 42

⇒x = 42

Hence, number of women in the society at first = x = 42